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BOTANICAL EXPLORATION IN HAMIRPUR DISTRICT (U. P.) WITH SPECIAL REFERENCE TO MAHOBA AQUATICS

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ABSTRACT

The paper includes an account of the vegetation of the Hamirpur District in South Uttar Pradesh as observed by the authors during three seasonal visits during 1961-62. The District has a large number of picturesque artificial lakes and water reservoirs and the aquatic flora has been given particular attention. The information gathered in this connection has been summarised in a table. The paper also includes an enumeration of more than 400 species of flowering plants and ferns which were gathered during the three collection tours.

INTRODUCTION

Lying between 79°5′ and 80°30′ E and 25° and 26°15′ N, the district Hamirpur in southern Uttar Pradesh forms a part of the vast plain of the territory formerly known as Bundelkhand. The district has an area of 7190 sq. km and stretches from Jumna in the north to the central Vindhyan plateau in the south and contains the famous artificial lakes of Mahoba. The western and the northern boundaries of the district are demarcated by the river Betwa and the Jumna and Betwa flow alongside the district headquarters. The southern part of Hamirpur being within the Vindhyan itself has a floristic composition comparable to that of the neighbouring districts, Banda and Jhansi. A large number of plants which are generally confined to central India have invaded the southern hilly areas of Mahoba sub-division.

A representative list of plants of the neighbouring Banda District was published by Edgeworth (1852 and 1866) but no published account of the flora of the Hamirpur District exists. Duthie (1903-1922) refers to a large number of interesting plants from Bundelkhand in his flora but references to the individual districts were not given. During recent years botanical exploration of the districts of southern U. P. has been undertaken by the Northern Circle of the Botanical Survey of India. As a part of this programme the authors made three visits to the Hamirpur District during 1961-62 and brought a collection of about 700 numbers which yielded more than 400 species including grasses and sedges and a few pteridophytes. Most impressive collection in the district is represented by the water and marsh plants within and around the lakes and aquatic zones of Mahoba, including the Betwa river margin. This aspect of the flora has been specially dealt with in the text. The vegetation of the district in general and its distribution in relation to topography has also been discussed.

The first collection from the district was made in Sept. 1961 and subsequent collections were made during the months of March and July, 1962 which included the Spring and Rainy season plants. The specimens are preserved in the Herbarium, Botanical Survey of India, Northern Circle with necessary index numbers and field data.

A perusal of the list reveals the following ten families in order of dominance: Leguminosae, Gramineae, Compositae, Cyperaceae, Euphorbiaceae, Acanthaceae, Malvaceae, Scrophulariaceae, Labiatae, Amaranthaceae.

TOPOGRAPHY AND GENERAL VEGETATION

Excepting the Mahoba sub-division which is a land of low barren hills, the greater portion of the district is plain, spreading northwards to the rivers Betwa and the Jumna. The vast plain area with deep black soil is comparatively arid, having scanty tree vegetation and has been subjected to cultivation. Wheat, Gram and Cotton are important agricultural products of the district.

The peripheral zone of the plain land towards the river Betwa is extremely undulated, created by innumerable ravines merging into the river bank and extending all along the course. The banks of these ravines and also the steep bank of the river contain some of the characteristic plants of arid zone viz., *Alhagi pseudalhagi, Crotalaria burhia, Pedalium murex, Tribulus terrestris, Withania somnifera, Pulicaria angustifolia* and others. These continue and flourish more towards the Betwa bank near Hamirpur. The most common plant of the rugged barren areas and also near the river bank is *Capparis decidua*. This interesting species is almost absent in the Mahoba sub-division and suddenly makes its appearance from Mauheda a place about 23 km north of Mahoba. All along the way to Hamirpur innumerable bushes of the species flourish. Irregularly scattered bushes of *Butea monosperma* could be seen at some places blazing in barren waste fields, during the month of March. Many of them invade the cultivated lands. On the other hand, towards the western side of Mahoba, vast land areas are covered with stunted *Butea monosperma*.

The rivers Betwa and Jumna occupy a considerable proportion of land area along their courses

around the district and the vegetation of the banks requires special mention. The flat river bank, in addition to some cultivated crops, shelters *Acacia nilotica* in large numbers and occasionally *Zizyphus mauritiana* occurs in association. On the other hand the steep banks with seasonal alterations sustain a characteristic flora in addition to some arid zone plants mentioned earlier. Some of the common plants not reaching down to water margin in the area include *Chrozophora obliqua, Kickxia ramosissima, Buddleia asiatica, Cassia occidentalis, Croton bonplandianum, Anisomeles indica, Calotropis procera, Trianthema portulacastrum, Xanthium strumarium, Datura innoxia, Indigofera tinctoria, Corchorus tridens, Malvastrum coromandelianum, Sutera dissecta, Gnaphalium indicum, G. purpureum, G. pulvinatum, Pulicaria foliolosa, Veronica anagallis, Potentilla supina, Verbascum chinense, Nicotiana plumbaginifolia, Ranunculus sceleratus, Polygonum plebejum, Scirpus affinis* and several others. The common general vegetation in other parts of the plain specially within shady groves or along the margins of depressions and within waste cultivated fields, have been mentioned in the list. However, the most interesting meadow herb during early spring was *Convolvulus microphyllus* with pretty pinkish white flowers.

It has been stated earlier that the southern part of Hamirpur is hilly and the small hillocks are scattered with considerable gaps in between them. These are mostly within 200-500 m and apparently look quite barren. In comparison to the vegetation on the Vindhyan hills as observed in Mirzapur district (*Bhattacharyya*, 1963) the small hills at Mahoba are less rich in composition. However, the scrubby vegetation appears to be of identical nature and some of the characteristic members include *Flacourtia indica, Carissa opaca, Zizyphus rotundifolia, Securinega virosa, Butea monosperma.* These are associated with climbers like *Capparis horrida, Ichnocarpus frutescens, Gymnema sylvestre, Cocculus hirsutus* and others. At lower foot hills *Adhatoda vasica* was very common. The peculiar leafless green parasite *Cassytha filiformis* was profusely growing on *Carissa opaca* and was common on the hillls around Mahoba. The parasite was also flourishing on *Lawsonia inermis* planted in hedges. Some of the common trees on the hill slopes are represented by *Wrightia tinctoria, Holoptelea integrifolia, Morinda tinctoria, Annona squamosa, Madhuca indica, Azadirachta indica, etc.* The plain lands around the hills also support a large number of *Madhuca indica* and the plants were in profuse bloom during March. Herbaceous elements on the hill slopes were fairly rich and some of the common plants seen here include *Vicoa auriculata, Chrysanthellum indicum, Pulicaria angustifolia, Cassia tora, Anisochilus carnosus, Hibiscus lobatus, Borreria stricta, B. articularis, Cyanotis fasciculata, Hybanthus enneaspermus, Tephrosia purpurea, Trichodesma indicum, T. zeylanicum, Polycarpaea corymbosa, Vernonia cinerea* and several others mentioned in the list.

AQUATIC VEGETATION OF MAHOBA

The floristic composition of Hamirpur District is specially interesting on account of the aquatic vegetation within and around the lakes of Mahoba sub-division. The magnificent water reservoirs of Mahoba "were constructed by the Chandel Rajahs before the Mohammedan conquest, for irrigation and as sheets of ornamental water" (Encycl. Brit. Vol. 11:130). Generally the intervening depressions amongst the hills have helped in constructing these perennial lakes of considerable depth and many of them have an area of several square kilometers like Bela Tal, Majhegawan tank, Vijayanagar Tal, etc. As the construction of these perennial lakes dates back to twelfth century they have accommodated an enormous reserve of aquatic vegetation for centuries together. The faces of the lakes and the vast peripheral inundating land surface show a remarkable change in the distribution of aquatic and amphibian flowering plants throughout the year. Permanent aquatic zones within such a small area have considerably influenced the subsoil water level, with the result low lying lands retain water for a long time after the rains and help in the growth of many water plants. Middle of September to early October is the best season for collecting aquatic members at Mahoba.

From the early spring the elegant looking *Nelumbium* starts coming upon the surface of the crystal clear water and flourishes to the middle of September and by that time many of them are eradicated giving priority to *Trapa.* From September to the end of cold months a luxuriant growth of this economic plant is maintained in most of the lakes The shallow water margin of the lakes in autumn is covered with showy *Nymphaea nouchali* and *N. stellata* accompanied by pretty *Utricularia flexuosa, Aponogeton natans, Ipomoea aquatica.* Presence of *Ottelia alismoides, Limnophyton obtusifolium,* in those areas is not uncommon. During September *Nymphoides cristatum* in profuse bloom is abundantly found all along the water margin of the lakes and within shallow water deposits at Mahoba. *Hygroryza aristata* and *Pseudoraphis spinescens* are the two interesting aquatic grasses commonly distributed within the lakes, of which the former is more luxuriant on deep water surface. Apart from the plants mentioned hereto *Ceratophyllum demersum* and *Hydrilla verticillata* are two constantly occurring submerged aquatics within the perennial lakes. Marshy areas around the lakes were found to support a luxuriant growth of *Sopubia delphinifolia* and *Ammannia multiflora,* the former was also found profusely on shallow grassy meadows. Besides the lakes other aquatic zones along the

roadsides and bordering cultivated fields contained *Najas graminea, N. minor* and *Nechamandra alternifolia* in abundance. The most abundant aquatic members in shallow waters around cultivated fields in autumn were *Sagittaria guayanensis, Oryza rufipogon* and *Ischaemum rugosum*. Along the margins of such aquatic zones the notable flowering plants include *Jussiaea suffruticosa, Hygrophila auriculata, Dopatrium junceum, Cyanotis axillaris, Caesulia axillaris, Alternanthera sessilis* and *Monochoria vaginalis*.

The characteristic aquatic members seen during monsoon and post-monsoon seasons are markedly changed during the drier months. In addition to *Ceratophyllum* and *Hydrilla,* profuse growth of *Potamogeton crispus* is visible as submerged aquatic during March within the lakes. Along the margins of some lakes a thick growth of *Potamogeton nodosus* and pretty *Nymphoides indicum* may be noted. At several places *N. indicum* and *N. cristatum* were found to grow in close association. *Pistia stratiotes* and *Spirodela polyrrhiza* were fairly common in many lakes and the interesting free floating *Lemna trisulca* was occasionally seen along the margins of perennial lakes during spring. The pretty *Jussiaea repens* with white flowers was also very common along the margins of the lakes during this season. On drying marshy grounds *Scirpus articulatus* and *S. supinus* were plenty and in comparatively shady areas *Limnophila indica* and *Hoppea dichotoma* in association with *Centaurium roxburghii* were quite common.

The aquatic vegetation in the placid shallow water of the Betwa river margin near Hamirpur needs special mention. During the dry months *Potamogeton pectinatus* and *P. perfoliatus* form thick growths along the margin. In comparatively shallow water *Vallisneria spiralis* is found in large numbers. *Eleocharis palustris* and *Scirpus mucronatus* were frequently observed in the same area in association with the earlier mentioned plants.

The entire aquatic collection made around Mahoba, Bela Tal and in the Betwa river margin is summarized in the following table:

ENUMERATION OF PLANTS

RANUNCULACEAE

Ranunculus sceleratus Linn.

Annual herb, flowers yellow, common in Jumna and Betwa river banks. Hamirpur, *Bhatt.* 20953, Mar. 1962.

ANNONACEAE

Annona squamosa Linn.

A shrub or small tree with pale green flowers. and Betwa river banks. Hamirpur, *Bhatt.* 20953, 20404, Sept. 1961, Mar. 1962.

MENISPERMACEAE

Cissampelos pareira Linn.

Herbaceous climber, flowers small greenish white, male in axillary loose cymes. Fairly common. Mahoba, *Bhatt.* 17902, Sept. 1961.

Cocculus hirsutus (Linn.) Diels.

Climbing shrub, flowers yellow. Common on the hill slopes. Mahoba, *Bhatt.* 20402, Mar. 1962.

C. pendulus (Forst.) Diels.

Climbing shrub, flowers small yellow, fruits green and black. Mahoba, *Bhatt.* 20415, Mar. 1962.

Tinospora cordifolia Miers.

Herbaceous climber with greenish yellow male flowers. Fairly common. Charkhari, *Malhotra* 21481, July 1962.

NYMPHAEACEAE

Nelumbo nucifera Gaertn.

Aquatic herb, rhizomes more than 12 meters deep inside the water. Flowers pale pink, mildly fragrant. Abundant in the lakes. Mahoba, *Bhatt.* 17956, Sept. 1961 ; *Malhotra* 21441, July 1962.

Nymphaea nouchali Burm. f.

Aquatic herb with rhizomatous stem and toothed rounded leaves, flowers showy white. Abundant in the shallow water of the lake. Mahoba, *Bhatt.* 17949, Sept. 1961 ; *Malhotra* 21464, July 1962.

N. stellata Willd.

Aquatic herb with small floating leaves, purple beneath, flowers bluish white. Fragrant. Mahoba, *Bhatt.* 17916, Sept. 1961.

PAPAVERACEAE

Argemone mexicana Linn.

Prickly herb with yellow juice, flowers bright yellow. Very common. Mahoba, *Malhotra* 22839, July 1962.

CRUCIFERAE

Cochlearia flava Buch.-Ham. ex Roxb.

Herb on moist depressed ground, flowers minute yellow, capsule globose. Fairly common. Hamirpur, *Bhatt.* 20932, Mar. 1962.

Rorippa indica (Linn.) Hiern.

Herb, flowers yellow, fruits slender, green. Occasional on the shady banks of the lake. Bela Tal, *Bhatt.* 21046, Apr. 1962.

CAPPARIDACEAE

Capparis decidua (Forsk.) Edgew.

Leafless profusely branching spinous shrub, flowers pinkish orange, abundant. Hamirpur, *Bhatt.* 17804, Sept. 1961.

C. sepiaria Linn.

Spinous climbing shrub, with flower buds. Mahoba, *Bhatt.* 20418, Mar. 1962.

C. zeylanica Linn.

Spinous shrub, flowers purplish white, common. Mahoba, *Bhatt.* 20406, Mar. 1962.

Cleome gynandra Linn.

Glandular hairy herb, flowers white. Fairly common. Hamirpur, *Bhatt.* 17799, Sept. 1963,

TABLE SUMMARISING THE AQUATIC COLLECTIONS FROM MAHOBA AND HAMIRPUR

Name	Family	Date	Habit	Frequency	Locality	Condition
1	2	3	4	5	6	7
Nelumbo nucifera Gaertn.	Nymphaeaceae	30-9-61 18-7-62	Fixed floating	Abundant	Mahoba	Fl. & Frs.
Nymphaea nouchali Burm. f.	,,	29-9-61	,,	,,	,,	Fls.
N. stellata Willd.	,,	18-7-62	,,	,,	,,	,,
Aeschynomene indica Linn.	Leguminosae	29-9-61	Erect amphibious	Common	,,	Fls. & Frs.
Neptunia oleracea Lour.	,,	31-3-62	Floating	Occasional	,,	Sterile
Ammannia baccifera Linn.	Lythraceae	27-3-62 18-7-62	Erect amphibious	Common	,,	Fls. & Frs.
A. multiflora Roxb.	,,	27-9-61	,,	,,	,,	,, ,,
Rotala leptopetala Koehne	,,	25-9-61	,,	Fairly common	,,	,, ,,
Jussiaea repens Linn.	Onagraceae	29-9-61 31-3-62	Floating creeping	,,	Mahoba, Bela Tal	Fls.
J. suffruticosa Linn.	,,	28-9-61 31-4-62	Erect amphibious	Common	Mahoba	,,
Trapa bispinosa Linn.	Hydrocaryaceae	29-9-61	Fixed floating	Abundant	,,	,,
Caesulia axillaris Roxb.	Compositae	27-9-61	Erect amphibious	Common	,,	,,
Nymphoides cristatum (Roxb.) Kuntze	Gentianaceae	28-9-61 19-7-62	Fixed floatin :	Abundant	,,	,,
N. indicum (L.) Kuntze	,,	2-4-62 19-7-62	,,	Common	Bela Tal, Mahoba	,,
Hoppea dichotoma Willd.	,,	26-3-62	Amphibious	Fairly common	Mahoba	Fls. & Frs.
Ipomoea aquatica Forsk.	Convolvulaceae	28-9-61 28-3-62	Creeping floating	Common	,,	Fls.
Bacopa monnieri (L.) Pennel	Scrophulariaceae	22-7-62	Repent amphibious	Fairly common	,,	,,
Dopatrium junceum (Roxb.) Buch.-Ham.	,,	25-9-62	Erect amphibious	Common	,,	,,
Glossostigma spathulatum Arn.	,,	27-3-63	Repent amphibious	,,	,,	Fls. & Frs.
Limnophila indica (L.) Druce	,,	31-3-63	Erect amphibious	,,	,,	Fls.
Utricularia flexuosa Vahl	Lentibular aceae	30-9-61 2-4-62	Free floating, submerged	,,	Mahoba, Bela Tal	,,
Hygrophila auriculata (Schum.) Heine	Acanthaceae	28-9-61	Erect amphibious	Abundant	Mahoba	,,
Phyla nodiflora (L.) Greene	Verbenaceae	18-7-62	Repent amphibious	Common	,,	,,
Alternanthera sessilis (L.) DC.	Amaranthaccae	25-9-61 22-7-62	Procumbent amphibious	,,	Hamirpur, Mahoba	Fls. & Frs.
Polygonum glabrum Willd.	Polygonaceae	18-7-62	Erect amphibious	Fairly common	Mahoba	Fls.
Ceratophyllum demersum Linn.	Ceratophyllaceae	29-9-61 27-3-62 18-7-62	Free floating submerged	Abundant	,,	Fls. & Frs.
Hydrilla verticillata (L. f.) Royle	Hydrocharitaceae	29-9-61	Fixed submerged	,,	,,	Fls.
Nechamandra alternifolia (Roxb.) Thw.	,,	29-9-61	,,	,,	,,	,,

Table contd.

1	2	3	4	5	6	7
Ottelia alismoides (L.) Pers.	Hydrocharitaceae	28-9-61	Fixed submerged	Common	Mahoba	Fls. & Frs.
Vallisneria spiralis Linn.	,,	29-9-61	,,	Abundant	Hamirpur, Betwa	Fls.
Monochoria vaginalis (Burm. f.) Presl ex Kunth.	Pontederiaceae	25-9-61	Fixed half-submerged	Common	Mahoba	Fls.
Cyanotis axillaris (L.) Schult. f.	Commelinaceae	25-9-61	Decumbent amphibious	,,	,,	,,
Typha angustata Bory et Chaub.	Typhaceae	19-7-62	Erect, half-submerged	,,	,,	,,
Pistia stratiotes Linn.	Araceae	30-9-61 20-7-62	Free floating	,,	,,	,,
Lemna paucicostata Hegelm.	Lemnaceae	29-9-61	,,	,,	,,	Fls. & Frs.
L. trisulca Linn.	,,	31-3-62	Submerged floating	Occasional	,,	Fls.
Spirodela polyrrhiza (L.) Schleid.	,,	29-9-61 3-9-62	Free floating	Common	,,	,,
Limnophyton obtusifolium (L.) Miq.	Alismataceae	29-9-61 3-4-62	Fixed half-submerged	,,	Mahoba, Bela Tal	Fls. & Frs.
Sagittaria guayanensis H. B. K.	,,	30-9-61	Fixed floating	Abundant	Mahoba	Fls.
Potamogeton crispus Linn.	Potamogetonaceae	28-3-62	Fixed submerged	,,	,,	,,
P. nodosus Poir.	,,	31-3-62 19-7-62	Fixed floating	,,	,,	,,
P. pectinatus Linn.	,,	29-3-62	Fixed submerged	,,	Hamirpur, Betwa	,,
P. perfoliatus Linn.	,,	29-3-62	,,	,,	,,	,,
Najas graminea Del.	Najadaceae	29-9-61	,,	,,	Mahoba	Fls. & Frs.
N. minor (Pers.) All.	,,	28-3-62	,,	Common	,,	Frs.
Cyperus corymbosus Rottb.	Cyperaceae	29-9-61 27-3-62	Fixed amphibious	,,	,,	Fls. & Frs.
C. difformis Linn.	,,	31-3-62	Marshy	,,	Mahoba	,, ,,
Eleocharis atropurpurea Kunth.	,,	22-3-62 19-7-62	,,	,,	,,	,, ,,
E. palustris (L.) R. Br.	,,	29-3-62 19-7-62	Fixed half-submerged	Fairly common	Hamirpur, Mahoba	,,
Fimbristylis schoenoides Vahl	,,	28-9-61	Marshy	Abundant	,,	,,
Juncellus allopecuroides Cl.	,,	27-3-62 18-7-62	Fixed half-submerged	Common	,,	,,
Scirpus articulatus Linn.	,,	22-3-62 19-7-62	,,	Abundant	,,	,,
S. maritimus Linn.	,,	29-3-62	Fixed amphibious	,,	Hamirpur, Betwa	,,
S. littoralis Schrad.	,,	29-3-62	Fixed half-submerged	,,	,,	,,
S. supinus Linn.	,,	31-3-62 19-7-62	Fixed amphibious	Fairly common	Mahoba	,,
Hygroryza aristata (Retz.) Nees ex W. & A.	Gramineae	29-9-61 31-3-62	Free floating amphibious	,,	,,	,,
Ischaemum rugosum Salisb.	,,	28-9-61	Fixed amphibious	Common	,,	,,
Oryza rufipogon Griff.	,,	30-9-61	,,	Abundant	,,	,,
Panicum paludosum Roxb.	,,	2-4-62	,,	Common	,,	,,
Paspalidium punctatum (Burm.) A. Camus	,,	28-3-62	,,	Fairly common	,,	,,
Pseudoraphis spinescens (Br.) Vickery	,,	29-3-61	Fixed floating	Abundant	,,	,,
Vetiveria zizanioides (L.) Nash.	,,	28-9-62	Fixed amphibious	Common	,,	,,
Marsilea minuta Linn.	Marsileaceae	20-7-62	Fixed floating	,,	Mahoba, Charkhari	Sporocarps.

Cleome viscosa Linn.

Glandular pubescent erect herb, flowers yellow, pods cylindrical. Common in cultivated fields and waste places. Mahoba, *Bhatt.* 17786, Sept. 1961 ; *Malhotra* 22840, July 1962.

Maerua arenaria Hk. f & Th.

Climbing and straggling shrub. Flowers greenish white, fruits lobed. Bela Tal, *Bhatt.* 21027, Apr. 1962.

VIOLACEAE

Hybanthus enneaspermus (Linn.) F. V. Muell.

Branching herb. Flowers small pink and fruits globose. Common under bushes. Mahoba, *Bhatt.* 17891, Sept. 1961 ; *Malhotra* 21475, July 1962.

BIXACEAE

Flacourtia indica (Burm. f.) Merr.

Thorny shrub, flowers small greenish yellow. Common. Mahoba, *Bhatt.* 20408, 20409, 20417, Mar. 1962.

POLYGALACEAE

Polygala chinensis Linn.

Small erect herb with yellow flowers. Mahoba, *Bhatt.* 17867, Sept. 1961.

P. erioptera DC.

Herb with pink flowers. Fairly common on dry grassy hill slopes and in waste cultivated fields. Mahoba, Hamirpur, *Bhatt.* 20434, 20967, Mar. 1962 ; *Malhotra* 21500, July 1962.

CARYOPHYLLACEAE

Polycarpaea corymbosa (Linn.) Lamk.

Small erect dichotomously branching herb, flowers minute white. Common on dry rocky soil. Mahoba, *Bhatt.* 17765, Sept. 1961.

Polycarpon prostratum (Forsk.) Asch. & Graebn.

Procumbent or decumbent herb. Flowers small white. Mahoba, *Bhatt.* 20423, Mar. 1962 ; *Malhotra* 21432, July 1962.

Spergula pentandra Linn.

Diffuse herb, flowers small white. Fairly common. Mahoba, *Bhatt.* 20458, 20914, Mar. 1962.

PORTULACACEAE

Portulaca oleracea Linn.

Annual succulent prostrate herb. Flowers small yellow. Common. Mahoba, *Bhatt.* 20447, Mar. 1962.

ELATINACEAE

Bergia ammannioides Roxb.

Prostrate herb, flowers minute purplish. Mahoba, *Bhatt.* 20911, Mar. 1962.

MALVACEAE

Abutilon indicum (Linn.) Sweet

Branching undershrub, flowers yellow, seeds winged. Fairly common on the river banks. Hamirpur, *Bhatt.* 17812, Sept. 1961.

A. ramosum Guill. & Perr.

Erect branching undershrub, flowers yellow. Mostly in dry condition. Mahoba, *Bhatt.* 20987, Mar. 1963.

Althaea ludwigii Linn.

Decumbent herb, flowers white, common in shallow ground. Hamirpur, *Bhatt.* 20941, Mar. 1962.

Hibiscus ficulneus Linn.

Herbs or undershrubs, stem purplish, flowers white. Mahoba, *Bhatt.* 17870, Sept. 1961.

H. micranthus Linn. f.

Erect herb with fruits. Common within bushes. Mahoba, *Bhatt.* 20437, Mar. 1962.

H. lobatus (Murr.) O. Kuntze

Erect pubescent herb, flowers white, common. Mahoba, *Bhatt.* 17898, Sept. 1961.

Malva parviflora Linn.

Decumbent herb, flowers white with fruits. Common. Mahoba, *Bhatt.* 20450, Mar. 1962.

Malvastrum coromandelianum (Linn.) Garcke

Rigid herb, flowers yellow. Common in shady places. Mahoba, *Bhatt.* 21005, Mar. 1962.

Pavonia odorata Willd.

Viscidly pubescent, much branched herb, flowers small pinkish white. Fairly common on the river banks. Hamirpur, *Bhatt.* 17826, Sept. 1961.

Sida cordifolia Linn.

Erect, grey tomentose herb, flowers pale yellow, in fascicles, common on the river bank. Hamirpur, *Bhatt.* 17811, 20994, Sept. 1961, Mar. 1962.

S. rhombifolia Linn.

Branching herb, flowers dull yellow. Common in shady places. Mahoba, *Bhatt.* 17907, Sept. 1961.

S. spinosa Linn.

Rigid herb, flowers yellowish white. Common. Hamirpur, *Bhatt.* 20931, Mar. 1962.

S. veronicaefolia Lamk.

Pubescent slender herb, flowers pale yellow. Common. Mahoba, *Bhatt.* 17945, Sept. 1961.

Urena lobata Linn.

Erect pubescent herb, flowers purplish. Common in waste shady places. Mahoba, *Bhatt.* 17894, Sept. 1961.

STERCULIACEAE

Melochia corchorifolia Linn.

Herb, flowers bluish white. Common in marshy places. Mahoba, *Bhatt.* 17939, Sept. 1961.

Sterculia urens Roxb.

Deciduous tree, flowers viscid, greenish brown, fruits with stinging hairs. Common. Mahoba, *Bhatt.* 20988, Mar. 1962.

TILIACEAE

Corchorus capsularis Linn.

Herbs in marshy land, flowers small yellow, cap-

sules globose, rugose. Fairly common. Mahoba, *Bhatt.* 17928, Sept. 1961.

Corchorus olitorius Linn.

Tall herb, flowers small yellow capsules long. Common in cultivatted fields. Hamirpur, *Bhatt.* 17833, Sept. 1961.

C. tridens Linn.

Herb, flowers minute yellow, capsule narrow, sessile in axils. Common on river banks. Hamirpur. *Bhatt.* 17818, 20936, Sept. 1961 ; Mar. 1962.

LINACEAE

Linum usitatissimum Linn.

Cultivated herb, flowers blue. Common. Mahoba, *Bhatt.* 20489, Mar. 1962.

ZYGOPHYLLACEAE

Tribulus terrestris Linn.

Decumbent herb, flowers pale yellow. Fruits spinous. Common on steep river banks. Hamirpur, *Bhatt.* 17827, 20944, Sept. 1961, Mar. 1962.

RUTACEAE

Aegle marmelos (Linn.) Corr.

Thorny tree, flowers greenish white, fragrant. Common. Mahoba, *Bhatt.* 20466, Mar. 1962.

Feronia limonia (Linn.) Swingle

Tree, flowers greenish, anthers purple. Common. Mahoba, *Bhatt.* 20467, Mar. 1962.

MELIACEAE

Azadirachta indica A. Juss.

Common tree, flowers white. Mahoba, *Bhatt.* 20465, Mar. 1962.

RHAMNACEAE

Zizyphus nummularia (Burm. f.) Wt. & Arn.

Dwarf rigid shrub, flowers greenish yellow. Fruits green. Common on the hill slopes. Mahoba, *Bhatt,* 17778, Sept. 1961 ; Charkhari, *Malhotra* 21484, July 1962.

VITACEAE

Ampelocissus latifolia (Roxb.) Planch.

Climber, flowers red, fruits green ; occasional. Mahoba, *Malhotra* 21497, July 1962.

Cayratia carnosa Gagnep.

Herbaceous climber, flowers greenish white. Common amongst bushes. Mahoba, *Bhatt.* 17954, Sept. 1961 ; Charkhari, *Malhotra* 21482, July 1962.

SAPINDACEAE

Cardiospermum halicacabum Linn.

Herbaceous climber, flowers white, fruits inflated. Common on bushes. Mahoba, Bela Tal, *Bhatt.* 17886, 21026, Sept. 1961, April 1962.

Dodonaea viscosa (Linn.) Jacq.

Shrubs, planted for hedge, fruits 3-winged. Mahoba, *Bhatt.* 20928, Mar. 1962.

ANACARDIACEAE

Lannea cormandelica (Houtt.) Merr.

Deciduous tree, flowers yellowish green. Occasional on dry hills. Mahoba, *Bhatt.* 20986, Mar. 1962.

LEGUMINOSAE

Aeschynomene indica Linn.

Marshy herb, flowers pale yellow, pods lobed. Common. Mahoba, *Bhatt.* 17940, Sept. 1961.

Alhagi pseudalhagi (Bieb.) Desv.

Small thorny shrub on the south facing bank of Betwa, flowers purple. Very common. Hamirpur, *Bhatt.* 20946, Mar. 1962.

Alysicarpus bupleurifolius DC.

Erect herb, flowers dull pink, common on moist grassy grounds. Mahoba, *Bhatt.* 17905, Sept. 1961.

A. tetragonolobus Edgew.

Procumbent herb, flowers pale purple. Common on the hill slopes. Mahoba, *Bhatt.* 17794, Sept. 1961.

A. vaginalis DC.

Herb, flowers purple, pods jointed. Common on the hill slopes. Mahoba, *Bhatt.* 20991, Mar. 1962.

Atylosia scarabaeoides Benth.

Herbaceous climber, flowers yellow, pods hairy. Common on bushes. Mahoba, *Bhatt.* 17890, Sept. 1961.

Butea monosperma (Lamk.) Taub.

Shrubs or trees, flowers showy vermilion. Abundant. Mahoba, *Bhatt.* 20411, Mar. 1962.

B. monosperma (Lam.) Taub. var. **lutea** (Will.) Mahesh.

Tree, flowers yellow, rare. Bela Tal, *Bhatt.* 21017, Apr. 1962.

Cajanus indicus Spreng.

Shrub, flowers yellow with pods. Common. Hamirpur, *Bhatt.* 20949, Mar. 1962.

Canavalia virosa Wt. & Arn.

Subwoody large climber. Pods large flat. Bela Tal, *Bhatt.* 21041, Apr. 1962.

Crotalaria burhia Buch.-Ham.

Shrub, flowers brownish yellow, common on Betwa river bank. Hamirpur, *Bhatt.* 20957, Mar. 1962.

C. hirsuta Willd.

Pubescent small herb, flowers pale yellow. Rare, with *Carissa* bushes. Mahoba, *Bhatt.* 17888. Sept. 1961.

C. juncea Linn.

Cultivated herbs, flowers large yellow, collected as an escape. Hamirpur, *Bhatt.* 20964, Mar. 1962.

C. medicaginea Lamk. var. **luxurians** (Benth.) Baker

Small branching herb with minute yellow flowers and globose pods. Very common. Mahoba, *Bhatt.* 17839, Sept. 1961.

Crotalaria prostrata Roxb.
Procumbent perennial herb, flowers yellow, pods small. Occasional. Mahoba, *Bhatt.* 20999, Mar. 1962.

Dalbergia sissoo Roxb.
Common avenue tree with fruits. Mahoba, *Bhatt.* 20901, Mar. 1962.

Desmodium gangeticum (Linn.) DC.
Herb with woody root stock and white or pinkish white flowers. Common in shady places. Mahoba, *Bhatt.* 17900, Sept. 1961.

D. triflorum DC.
Prostrate herb, flowers purple. Common in the open grassy fields. Mahoba, *Bhatt.* 20908, Mar. 1962.

Heylandia latebrosa DC.
Prostrate herb with perennial root stock, flowers yellow. Common on rocky hill slopes. Mahoba, *Bhatt.* 17866, Sept. 1961.

Indigofera cordifolia Heyne ex Roth.
Procumbent herb with deep seated tap root, flowers minute purple on dry hill slopes, amongst grasses. Common. Mahoba, *Bhatt.* 17791, Sept. 1961.

I. hirsuta Linn.
Herb, flowers dull red minute and pods strigose in compact racemes. Mahoba, *Bhatt.* 17880, Sept. 1961.

I. linifolia Retz.
Prostrate herb, root stock woody, flowers small purple. Mahoba, *Bhatt.* 17784, Sept. 1961 ; *Malhotra* 21499, July 1962.

I. linnaei Ali.
Prostrate herb, flowers minute dull purple. Very common on grassy fields. Mahoba, Hamirpur, *Bhatt.* 17883, 20945, Sept. 1961. Mar. 1962.

I. tinctoria Linn.
Slenderly branching herb, pods narrow. In waste places and rare on the river bank. Hamirpur, Mahoba, *Bhatt.* 17817, 20459, Sept. 1961, Mar. 1962.

I. trita Linn. f.
Pubescent branching herb, flowers pale purple. Mahoba, *Bhatt.* 17881, Sept. 1961. Hamirpur, 21050, Mar. 1962.

I. trifoliata Linn.
Erect herb, flowers vermilion coloured, pods with brown spots, rare amongst bushes. Mahoba, *Bhatt.* 17856, Sept. 1961.

Lathyrus sativus Linn.
Cultivated herb, flowers blue. Mahoba, *Bhatt.* 20496, Mar. 1962.

Lens esculenta Moench.
Common cultivated herb with fruits. Mahoba, *Bhatt.* 20498, Mar. 1962.

Medicago denticulata Willd.
Common herb, flowers yellow. Mahoba, *Bhatt.* 20482, Mar. 1962.

M. lupulina Linn.
Herb, flowers yellow and with fruits. Mahoba, *Bhatt.* 20477, Mar. 1962.

Melilotus alba Desr.
Erect herb, flowers white. Common in moist places. Mahoba. *Bhatt.* 20486, Mar. 1962.

M. indica (Linn.) All.
Herb minute, flowers yellow and with fruits. Common. Mahoba, *Bhatt.* 20469, Mar. 1962.

Phaseolus aconitifolius Jacq.
Trailing herb, flowers yellow, pods slender. Common on the river bank. Hamirpur, *Bhatt.* 17837, Sept. 1961.

P. trilobus Ait.
Herb, flowers small yellow, pods narrow. Mahoba, *Bhatt.* 17911, Sept. 1961.

Pongamia pinnata (Linn.) Pierre
Avenue tree, flowers white, calyx purple. Mahoba, *Malhotra* 22842, July 1962.

Psoralea corylifolia Linn.
Herb, flowers minute white, fruits, sickle-shaped Common in waste cultivated fields. Mahoba, *Bhatt.* 20912, Mar. 1962.

Rhynchosia minima DC.
Tender extensive climber, flowers small yellow, pods short. Common in bushes. Bela Tal, *Bhatt.* 21019, Apr. 1962.

R. sericea Spanoghe
Subwoody climber clothed with hairs, flowers white in clusters, standard purple inside. Rare, Mahoba, *Bhatt.* 17776, Sept. 1961.

Sesbania sesban (Linn.) Merr.
Small tree, fruits long. Bela Tal, *Bhatt.* 21045, Apr. 1962.

Tephrosia hamiltonii Drummond
Decumbent to prostrate herb, flowers small purple fairly common on the hill slopes. Mahoba, *Malhotra* 21451, July 1962.

T. hirta Ham.
Branching herb, flowers pale pink ; pods villous hairy. Fairly common. Mahoba, *Bhatt.* 17845, Sept. 1962.

T. purpurea (Linn.) Pers.
Annual herb, flowers pale pink. Common in waste places. Mahoba, *Bhatt.* 17764, Sept. 1961.

Teramnus labialis Spreng. var. **mollis** Baker
Herbaceous climber, flowers white, pods narrow. Common amongst bushes. Mahoba, *Bhatt.* 17860, Sept. 1961.

Trigonella hamosa Linn.
Herb, flowers white and fruits curved in clusters. Common in wet fields. Hamirpur, *Bhatt.* 20470, Mar. 1962.

Uraria picta Desv.
Gregarious dwarf shrub, collected with fruits. Rare. Mahoba, *Bhatt.* 17930, Sept. 1961.

Vicia hirsuta (Linn.) S. F. Gray
Herb, flowers minute white. Common in cultivated fields. Mahoba, *Bhatt.* 20495, 20497, Mar. 1962.

V. sativa Linn.
Common weed in cultivated fields. Pods sessile flat. Mahoba, *Bhatt.* 20488, Mar. 1962.

Cassia absus Linn.
Pretty branching herb, flowers orange red and with rugose pubescent flat pods. Common on hill slopes. Mahoba, *Bhatt.* 17884, Sept. 1961.

C. mimosoides Linn.
Decumbent herb, flowers minute yellow; pods flat. Very common on hill slopes. Mahoba, *Bhatt.* 17933, Sept. 1961.

C. occidentalis Linn.
Herb, flowers yellow, pods flat. Common on the river bank. Hamirpur, *Bhatt.* 17836, 20930, Sept. 1961, Mar. 1962.

C. tora Linn.
Common herb. Flowers yellow. Mahoba, *Bhatt.* 20433, Mar. 1962.

Tamarindus indica Linn.
Road side tree, flowers yellow; pods unripe. Mahoba, *Malhotra* 21443, July 1962.

Acacia catechu Willd.
Common tree, flowers yellowish white, fragrant. Charkhari, *Malhotra* 21485, July 1962.

A. leucophloea Willd.
Medium size tree, flowers yellowish white, fairly common on Betwa bank. Hamirpur, *Bhatt.* 17807, Sept. 1961.

A. nilotica (Linn.) Del.
Common medium size tree with lobed tomentose pods. Hamirpur, *Bhatt.* 17825, 20962, Sept. 1961, Mar. 1962; Mahoba, *Malhotra* 21463, July 1962.

Mimosa rubicaulis Lamk.
Prickly climbing shrub with globose white or pale purple head. Occasional. Mahoba, *Bhatt.* 17960, Sept. 1961.

Neptunia oleracea Lour.
Aquatic herb. Common on the lake margins. Sterile. Mahoba, *Bhatt,* 21001, Mar. 1962.

Pithecellobium dulce Benth.
Spinous tree, flowers creamish-white, often planted. Mahoba, *Bhatt.* 20464, Mar. 1962.

ROSACEAE

Potentilla supina Linn.
Procumbent annual herb, flowers small yellow. Common. Mahoba, *Bhatt.* 20478, Mar. 1962.

MYRTACEAE

Syzygium cumini (Linn.) Skeels
Planted tree with young buds. Abundant. Mahoba, *Bhatt.* 20917, Mar. 1962.

LYTHRACEAE

Ammannia baccifera Linn.
Annual herbs, flowers axillary minute. Common in moist places. Mahoba, *Bhatt.* 20487, Mar. 1962. *Malhotra* 21467, 22813, July 1962.

A. multiflora Roxb.
Slender erect herb, flowers minute, greenish red, stalked on the base of the leaves. Common in marshy places. Mahoba, *Bhatt.* 17851, Sept. 1961.

Lawsonia inermis Linn.
Spinous cultivated shrub used in hedges. Flowers yellowish white, fruits globose. Mahoba, *Bhatt,* 17947, Sept. 1961; *Malhotra* 21442, July 1962.

Punica granatum Linn.
Cultivated shrub, flowers crimson red. Planted. Mahoba, *Bhatt.* 20983, Mar. 1962.

Rotala leptopetala Koehne
Marshy herb, flowers minute, axillary sessile. Fairly common. Mahoba, *Bhatt.* 17766, Sept. 1961.

Woodfordia fruticosa (Linn.) Kurz.
Branching shrub, flowers, red. Common on the steep banks of stream. Bela Tal, *Bhatt.* 21036, April 1962.

ONAGRACEAE

Jussiaea perennis (Linn.) Brenan
Aquatic or marshy herb, flowers small yellow. Fairly common. Mahoba, *Bhatt.* 17780, Sept. 1961.

J. repens Linn.
Floating aquatic herb, flowers white. Fairly common on the edges of the lakes. Mahoba, Bela Tal, *Bhatt.* 17910, 21051, Sept. 1961, Apr. 1962.

J. suffruticosa Linn.
Half submerged or marshy sub-aquatic annual, flowers showy yellow. Common. Mahoba, *Bhatt.* 17893, 20977, Sept. 1961, Mar. 1962.

HYDROCARYACEAE (ONAGRACEAE BH)

Trapa bispinosa Roxb.
Abundant in lakes, flowers white, fruits with two spines. Mahoba, *Bhatt.* 17946, Sept. 1961.

CUCURBITACEAE

Blastania garcinii Cogn.
Herbaceous climber growing on *Capparis decidua,* flowers yellow; fruits oblique. Hamirpur, *Bhatt.* 17809, Sept. 1961.

Bryonopsis laciniosa (Linn.) Naud.
Extensive climber, flowers small greenish yellow and fruits globose. Fairly common on bushes. Mahoba, *Bhatt.* 17871, Sept. 1961.

Coccinia cordifolia (Linn.) Cogn.
Herbaceous climber, flowers white. Fairly common. Hamirpur, *Bhatt.* 17806, Sept. 1961.

Luffa aegyptiaca Mill.
Herbaceous climber with large yellow flowers. Common. Mahoba, *Bhatt.* 17959, Sept. 1961.

Luffa echinata Roxb.

Herbaceous dioecious climber. Flowers white. Fruits spinous. Common on hedges. Hamirpur, Mahoba, *Bhatt.* 17843, 17906, 17967, Sept. 1961.

Melothria maderaspatana (Linn.) Cogn.

Scabrous slender climber with minute axillary yellow flowers and globose fruits. Hamirpur, *Bhatt.* 17842, Sept. 1961.

Momordica dioica Roxb.

Herbaceous dioecious climber, flowers white. Fruits spinous. Mahoba, *Malhotra* 22824, July 1962.

Trichosanthes cucumerina Linn.

Foetid herb, flowers white, fruits white striped, orange when ripe. Common in shady bushes. Mahoba, *Bhatt.* 17879, Sept. 1961 ; *Malhotra* 22823, July 1962.

CACTACEAE

Opuntia monacantha Haw.

Spinous succulent shrub, flowers orange. Common on the hill slopes. Bela Tal, *Bhatt.* 21042, Apr. 1962.

MOLLUGINACEAE

Glinus lotoides Linn.

Procumbent herb, flowers green. Common on shallow ground. Mahoba, *Bhatt.* 20405, Mar. 1962 ; *Malhotra* 21461, July 1962.

G. oppositifolius (Linn.) A. DC.

Prostrate herb, flowers green. Charkhari, *Malhotra* 21487, July 1962.

Mollugo pentaphylla Linn.

Diffuse herb, flowers cream coloured in loose branching panicle. Occasional. Mahoba, *Bhatt.* 17922, 20424, Sept. 1961 ; *Malhotra* 22818, July 1962.

AIZOACEAE

Trianthema decandra Linn.

Pendent, much branched soft herb. Flowers small, purplish green. Very common on the steep river banks. Hamirpur, *Bhatt.* 17803, Sept. 1961.

UMBELLIFERAE

Anethum sowa Kurz

Cultivated aromatic herb, flowers yellow. Mahoba, *Bhatt.* 20918, Mar. 1962.

Coriandrum sativum Linn.

Cultivated herb, flowers white. Mahoba, *Bhatt.* 20490, Mar. 1962.

CORNACEAE

Alangium salvifolium (Linn. f.) Wang.

Shrubs or crooked deciduous trees with fragrant white flowers. Common. Bela Tal, *Bhatt.*, 21018, Mar. 1962.

RUBIACEAE

Borreria stricta (Linn. f.) Schum.

Scabrous erect herb, flowers white. Common on the hill slopes. Mahoba, *Bhatt.* 17877, Sept. 1961.

Dentella repens Forst.

Trailing herb rooting at the nodes ; flowers axillary white. Common in moist places. Mahoba, *Malhotra* 21433, July 1963.

Morinda tinctoria Roxb.

Small tree, flowers white funnel shaped, fruit an aggregate fleshy drupe. Common on the hill slopes. Mahoba, *Bhatt.* 17796, Sept. 1961 ; *Malhotra* 21449, July 1962.

Oldenlandia aspera DC.

Erect scabrid herb, flowers pale brown, fruits greyish white. Common in waste cultivated fields. Hamirpur, *Bhatt.* 20935, Mar. 1962.

O. corymbosa Linn.

Diffuse herb, flowers small white. Common in cultivated fields. Hamirpur, *Bhatt.* 20934, Mar. 1962 ; Mahoba, *Malhotra* 22828, July 1962.

COMPOSITAE

Ageratum conyzoides Linn.

Common herb, heads bluish white. Mahoba, *Bhatt.* 21009, Mar. 1962.

Amberboa ramosa Wagen.

Herb, heads pinkish white, bracts spinous. Fairly common. Mahoba, *Bhatt.* 20438, Mar. 1962.

Bidens biternata (Lour.) Merr. & Sherff.

Erect branching herb, with oblong green heads ; rays white, disc florets yellow. Seeds dark brown. Common on hill slopes. Mahoba, *Bhatt.* 17787, Sept. 1961.

Blainvillea acmella (Linn. f.) Philipson

Herb, heads greenish white. Common in cultivated fields. Hamirpur, *Bhatt.* 17835, Sept. 1961.

Blumea eriantha DC.

Herb with yellowish heads. Occasional. Bela Tal, *Bhatt.* 21049, Apr. 1961.

B. laciniata (Roxb.) DC.

Herb, heads greenish white, common in waste places. Mahoba, *Bhatt.* 20463, Mar. 1962.

B. mollis (Don.) Merr.

Common herb, heads white. Mahoba, Bela Tal, *Bhatt.* 20443, 21028, Mar., Apr. 1962.

B. oxyodonta (Wall.) DC.

Aromatic herb, heads greenish yellow. Fairly common. Mahoba, Bela Tal, *Bhatt.* 20429, 20432, 20907, 21040, Mar., Apr. 1962.

Caesulia axillaris Roxb.

Marshy herb with axillary, sessile white heads. Common. Hamirpur, *Bhatt.* 17854, Sept. 1961.

Chrysanthellum indicum DC.

Decumbent herb, heads small yellow. Common on the hill slopes. Mahoba, *Bhatt.* 17929, Sept. 1961.

Cotula anthemoides Linn.

Prostrate herb, heads small, yellow. Occasional. Hamirpur, *Bhatt.* 20952, Mar. 1962.

Cyathocline purpurea (Don.) Kuntze

Herb, heads white and purple. Fairly common

on shady stream bank. Bela Tal, *Bhatt.* 21032, 21033, Apr. 1962.

Echinops echinatus Roxb.
Spinous robust herb, heads spinous, globose, flowers white. Common. Mahoba, *Bhatt.* 20412, Mar. 1962; *Malhotra* 22812, July 1962.

Eclipta prostrata (Linn.) Linn.
Herb, heads white. Common near wet places. Mahoba, *Malhotra* 22807, July 1962.

Emilia sonchifolia DC.
Herb heads tubular, flowers pink. Common. Mahoba, *Bhatt.* 17885, 21006, Sept. 1961, Mar. 1962.

Erigeron asteroides Roxb.
A course pubescent herb. Heads violet. Mahoba, *Malhotra* 21478, July 1962.

Glossocardia bosvallea (Linn. f.) DC.
Prostrate herb, heads green, oblong, common. Mahoba, *Bhatt.* 17769, Sept. 1961.

Gnaphalium indicum Linn.
Herb, heads brownish white. Common. Mahoba, Hamirpur, *Bhatt.* 20425, 20955, Mar. 1962.

G. affine D. Don
Silky herb, heads greenish yellow. Mahoba, *Bhatt.* 21007, Mar. 1962.

G. pulvinatum Delile
Procumbent herb forming rosettes with sunken woolly brownish heads. Mahoba, Hamirpur, *Bhatt.* 20479, 20956, Mar. 1962.

G. purpureum Linn.
Erect herb, heads hairy brownish white. Fairly common. Mahoba, *Bhatt.* 21008, Mar. 1962.

Grangea maderaspatana Poir.
Decumbent herb, heads yellow and purplish, fairly common. Mahoba, *Bhatt.* 20474, Mar. 1962.

Launea nudicaulis Hk. f.
Flat herb, heads yellow, fairly common. Mahoba, *Bhatt.* 17909, Sept. 1961.

L. sarmentosa (Willd.) Alston.
Glabrous herb, rooting at the nodes. Heads solitary or in clusters; yellow. Mahoba, *Malhotra* 22845, July 1962.

Pulicaria angustifolia DC.
Decumbent hairy herb, heads yellow. Common on dry hill slopes. Mahoba, Hamirpur, *Bhatt.* 17770, Sept. 1961; *Malhotra* 21444, July 1962.

P. foliolosa DC.
Decumbent herb, heads yellow, very common on the river banks. Hamirpur, *Bhatt.* 20959, Mar. 1962.

Sclerocarpus africanus Jacq.
Herb in shady places with yellow sessile heads. Common. Mahoba, *Bhatt.* 17897, Sept. 1961.

Sonchus asper Hill.
Tall herb, heads yellow. Common. Mahoba, *Bhatt.* 20448, Mar, 1962.

S. oleraceous Linn.
Herb, heads large, yellow. Mahoba, *Bhatt.* 21012, Mar. 1962.

Sphaeranthus indicus Linn.
Procumbent herb, heads purple, globose. Common on shallow moist ground. Mahoba, *Bhatt.* 20421, Mar. 1962.

Spilanthes acmella Linn. var. **oleracea** Clarke
Herb, heads purplish yellow. Planted. Bela Tal, *Bhatt.* 21044, Apr. 1962.

Tridax procumbens Linn.
Common herb on building refuses, heads yellow, with white rays. Mahoba, *Bhatt.* 20435, Mar. 1962. *Malhotra* 22086, July 1962.

Vernonia cinerea Less.
Herb, heads pink. Common on hill slopes. Mahoba, *Bhatt.* 20416, Mar. 1962; *Malhotra* 21450, 22837, July 1962.

Vicoa indica DC.
Erect deep green herb on rocks, heads yellow. Common. Mahoba, *Bhatt.* 17925, 20460, Sept. 1961, Mar. 1962.

Xanthium strumarium Linn.
Common weed on the river bank. Fruits hooked, spinous. Hamirpur, *Bhatt.* 20971, Mar. 1962.

CAMPANULACEAE

Campanula canescens Wall.
Erect herb, flowers dimorphic, normal ones bluish white. Bela Tal, *Bhatt.* 21035, 21047, Apr. 1962.

PLUMBAGINACEAE

Plumbago zeylanica Linn.
Branching herb, flowers white, calyx glandular hairy, viscid. Rare. Mahoba, *Bhatt.* 17964, Sept. 1961.

PRIMULACEAE

Anagallis arvensis Linn.
Pretty herb, flowers blue. Common in moist places. Mahoba, *Bhatt.* 20480, 20492, Mar. 1962.

SAPOTACEAE

Madhuca indica Gmel.
Tree, flowers fragrant, globose in rusty inflorescence. Common. Mahoba, *Bhatt.* 20500, Mar. 1962.

APOCYNACEAE

Carissa opaca Stapf
Thorny shrub with fragrant white flowers. Abundant. On the hill slopes. Mahoba, *Bhatt.* 20401, Mar. 1962.

Holarrhena antidysenterica Wall.
Shrub or small tree, flowers white, fragrant, fruits cylindrical. Common on the hill slopes. Mahoba, *Malhotra* 22809, July 1962.

Ichnocarpus frutescens (Linn.) Ait. & Ait.
Shruby climber with fragrant minute white

flowers. Common. Mahoba, *Bhatt.* 17957, Sept. 1961.

Vallaris solanacea (Roth) O. Kuntze

Climbing shrub, flowers fragrant, white. Occasional. Bela Tal, *Bhatt.* 21020. Apr. 1962.

Wrightia tinctoria R. Br.

Small tree, flowers white. Follicles paired, jointed at the tip. Fairly common on the hill slopes. Mahoba, *Bhatt.* 17777, 20422, Sept. 1961, Mar. 1962.

ASCLEPIADACEAE

Calotropis procera Br.

Shrub, flowers purplish white. Common on the river banks. Hamirpur, *Bhatt.* 20960, Mar. 1962.

Cryptolepis buchananii Roem.

Climbing shrub, flowers greenish yellow. Fairly common. Bela Tal, *Bhatt.* 21022, Apr. 1962.

Gymnema sylvestre Schult.

Climbing shrub, flowers small yellow with follicles. Mahoba, *Bhatt.* 20410, Mar. 1962.

Oxystelma esculentum Br.

Extensive climbing shrub, along the margins of the flowing streams, sterile. Occasional. Mahoba, *Bhatt.* 21054, Mar. 1962.

Pergularia daemia (Forsk.) Chiov.

Climbing shrub, flowers greenish white, fruits spinous. Fairly common. Mahoba, *Bhatt.* 20436, Mar. 1962; Charkhari, *Malhotra,* 21483, July 1962.

Telosma pallida (Roxb.) Craib

Climber, flowers greenish white, common. Mahoba, *Malhotra* 22802, July 1962.

GENTIANACEAE

Canscora diffusa Br.

Diffuse herb on stream banks, flowers pale pink or white. Common. Bela Tal, *Bhatt.* 21030, Apr. 1962.

Centaurium roxburghii (G. Don) Druce

Pretty small herb with pale pink or white flowers. Mahoba, *Bhatt.* 20426, Mar. 1962; *Malhotra* 22857, July 1962.

Enicostema verticillatum (Linn.) Engl.

Perennial herbs. Flowers axillary white. Common on hill slopes. Mahoba, *Bhatt.* 17771, Sept. 1961; *Malhotra* 21459, July 1962.

Hoppea dichotoma Willd.

Small herb. Flowers greenish yellow. Common in moist places. Mahoba, *Bhatt.* 20428, Mar. 1962.

Nymphoides indicum (Linn.) O. Kuntze

Fixed aquatic herb, leaves floating, flowers large white. Common on the margins of the lakes. Bela Tal, *Bhatt.* 21024, Apr. 1962. Mahoba, *Malhotra* 21470, July 1962.

N. cristatum (Roxb.) O. Kuntze

Aquatic herb, with floating leaves. Flowers white, very common in pools. Mahoba, *Bhatt.* 17864, Sept. 1961; *Malhotra* 21471, July 1962.

BORAGINACEAE

Coldenia procumbens Linn.

Procumbent herb on south facing banks of lakes, flowers minute green, also with fruits. Common. Mahoba, *Bhatt.* 20976, Mar. 1962; *Malhotra* 21439, July 1962.

Cordia dichotoma Forsk. f.

Tree with thick leaves and white flowers. Occasional on the road side. Bela Tal, *Bhatt.* 21021, Apr. 1962.

Ehretia laevis Roxb.

A common tree with orange and green fruits. Mahoba, *Bhatt.* 20407, Mar. 1962.

Heliotropium ovalifolium Forsk.

Erect or decumbent herb, densely clothed with hairs, flowers white. Mahoba, *Malhotra* 21453, 21454, July 1962.

H. strigosum Willd.

Prostrate, strigose hairy herb, flowers small white. Mahoba, *Bhatt.* 17767, Sept. 1961, 20442, Mar. 1962; *Malhotra* 21473, July 1962.

H. supinum Linn.

Tomentose herb, flowers minute, white. Mahoba, Hamirpur, *Bhatt.* 20427, 20940, Mar. 1962.

Trichodesma indicum R. Br.

Strigose hairy herb, flowers bluish white. Common on hill slopes. Mahoba, *Bhatt.* 17904, Sept. 1961; *Malhotra* 21498, July 1962.

T. zeylanicum R. Br.

Erect strigose hairy herb, flowers white, calyx rounded at the base. Common on the hills. Mahoba, *Bhatt.* 20985, Mar. 1962.

CONVOLVULACEAE

Convolvulus microphyllus Sieb. ex Spreng

Prostrate, perennial, herb, flowers pinkish white. Abundant. Mahoba, *Bhatt.* 20905, Mar. 1962; *Malhotra* 21476, July 1962.

Cuscuta reflexa Roxb.

Leafless parasite on *Adhatoda* with flowers and fruits. Mahoba, *Bhatt.* 21003, July 1962.

Evolvulus alsinoides Linn.

Prostrate perennial herb, flowers blue. Common. Mahoba, *Bhatt.* 20906, Mar. 1962; *Malhotra* 21477, July 1962.

Ipomoea aquatica Forsk.

Floating aquatic herb, flowers showy pale purple. Common. Mahoba, *Bhatt.* 17892, Sept. 1961; 20921, Mar. 1962.

I. hispida (Vahl) R. & S.

Pubescent slender climber, flowers small white. Common on the hill slopes amongst bushes. Mahoba, *Bhatt.* 17882, Sept. 1961.

I. obscura Ker.

Extensive herbaceous climber, flowers white. Common on hedges. Mahoba, *Bhatt.* 17923, 20445, Sept. 1961, Mar. 1962.

Ipomoea pes-tigridis Linn. var. **capitellata** (Chois.) Clarke

Pubescent climber with pinkish white flowers in axillary cymes. Common in cultivated fields. Hamirpur, *Bhatt.* 17798, Sept. 1961.

Jacquemontia paniculata (Burm. f.) Hall. f.

Herbaceous climber, flowers white. Common. Mahoba, Bela Tal, *Bhatt.* 20444, 21016, Mar. 1962, Apr. 1962.

Merremia tridentata (Linn.) Hall. f.

Herb, root stock perennial, flowers small, yellow. Common. Mahoba, *Bhatt.* 20440, Mar. 1962.

SOLANACEAE

Datura innoxia Mill.

Herb, flowers large white. Common in waste places. Mahoba, *Bhatt.* 20446, Mar. 1962.

D. metel Linn.

Robust branching herb, flowers white, funnel shaped. Common on river bank. Hamirpur. *Bhatt.* 17814, Sept. 1961; Mahoba, *Malhotra* 22841, July 1962.

Lycopersicon esculentum Mill.

Cultivated herb, flowers yellow, collected as an escape on Jumna bank, common. Hamirpur, *Bhatt.* 20968, Mar. 1962.

Nicotiana plumbaginifolia Viv.

Viscid herb, flowers pale pink. Common on moist river bank. Hamirpur, *Bhatt.* 20939, Mar. 1962.

Physalis minima Linn.

Herb, flowers pale yellow and ovoid-inflated fruits. Mahoba, *Bhatt.* 17878, Sept. 1961.

Solanum nigrum Linn.

Herb, flowers white, fruits green. Common in shady places. Bela Tal, *Bhatt.* 21043, Apr. 1962; Mahoba, *Malhotra* 22832, July 1962.

S. surattense Burm. f.

Prickly perennial herb, flowers purple. Common in waste places. Mahoba, Hamirpur, *Bhatt.* 17774, 20948, Sept. 1961, Mar. 1962; *Malhotra* 21494, July 1962.

Withania somnifera Dun.

Herb or undershrub, flowers pale green, fruits with accrescent calyx. Very common on the dry river bank. Hamirpur, *Bhatt.* 17816, 20950, Sept. 1961, Mar. 1962.

SCROPHULARIACEAE

Antirrhinum orontium Linn.

Erect herb, flowers white. Occasional. Mahoba, *Bhatt.* 20978, Mar. 1962.

Bacopa monnieri (Linn.) Pennell

Herbs near water, flowers white to pinkish white. Common. Mahoba, *Malhotra* 22838, July 1962.

Dopatrium junceum (Roxb.) Buch.-Ham. ex Benth.

Aquatic or marshy herb, slender and almost leafless, flowers white, common. Mahoba, *Bhatt.* 17779, Sept. 1961.

Glossostigma spathulatum Arn.

Minute herbs on mud, flowers white. Common. Mahoba, *Bhatt.* 20980, Mar. 1962.

Kickxia ramosissima (Wall.) Janchen

Perennial herb, flowers yellow, common on the steep river banks. Hamirpur, *Bhatt.* 20958, Mar. 1962.

Limnophila indica (Linn.) Druce

Erect herb in marshy areas, flowers small bluish white, fairly common. Mahoba, *Bhatt.* 20473, Mar. 1962.

Lindenbergia indica (Linn.) O. Kuntze

Herb, flowers yellow, common on dry walls, Mahoba, *Bhatt.* 20441, 20480, Mar. 1962.

Lindernia ciliata (Colsm.) Pennell

Small herb, flowers white, fruits linear. Common. Mahoba, *Bhatt.* 17942, Sept. 1961.

L. crustacea (Linn.) Muell, F.

Small herb, flowers white. Common. Mahoba *Bhatt.* 17941, Sept. 1961.

Sopubia delphinifolia G. Don

Marshy herb growing amongst grasses and sedges, flowers pale pink. Very common around lakes. Mahoba, *Bhatt.* 17846, Sept. 1961.

Striga euphrasioides (Vahl) Benth.

Erect strigose herb, flowers white, fairly common on grassy hill slopes. Mahoba, *Bhatt.* 17772, Sept. 1961; *Malhotra* 22830, July 1962.

Sutera dissecta (Del.) Walp.

Herb, flowers minute, white also with fruits. Common on river bank. Hamirpur, *Bhatt.* 20954, Mar. 1962.

Verbascum chinense (Linn.) Sant.

Viscidly pubescent herb, flowers yellow. Common in waste places. Mahoba, *Bhatt.* 20457, Mar. 1962; *Malhotra* 22803, July 1962.

OROBANCHACEAE

Orobanche cernua Loeffl.

Fleshy parasitic weed in the cultivated fields of Tomato and Mustard. Common. Mahoba, *Bhatt.* 20913, Mar. 1962.

LENTIBULARIACEAE

Utricularia flexuosa Vahl

Submerged, floating aquatic with bladders, flowers yellow on subaerial racemes. Abundant in lakes. Mahoba, Bela Tal, *Bhatt.* 17958, 21417, Sept. 1961, Apr. 1962; *Malhotra* 21438, 21466, July 1962.

MARTYNIACEAE

Martynia annua Linn.

Large viscid herb, flowers pale pink. Very common. Mahoba, *Bhatt.* 17874, Sept. 1961.

PEDALIACEAE

Pedalium murex Linn.

Fleshy viscid herb, flowers yellow, fruits four horned. Common on the river bank. Hamirpur, *Bhatt.* 17813, Sept. 1961.

ACANTHACEAE

Adhatoda vasica Nees

Perennial undershrub, flowers white. Abundant. Mahoba, *Bhatt.* 21004, Mar. 1962.

Andrographis echioides Nees

Viscidly pubescent herb on dry rocky soil, flowers white. Occasional. Mahoba, *Bhatt.* 17790, Sept. 1961.

Barleria prionitis Linn.

Spinous undershrub, flowers cream yellow. Planted. Hamirpur, *Bhatt.* 20974, Mar. 1962.

Blepharis maderaspatensis (Heyne) ex Roth

Decumbent herb, flowers white. Fairly common on the shady hill slopes. Mahoba, *Bhatt.* 20431, Mar. 1962.

Dipteracanthus prostratus (Poir.) Nees

Herb, stem, jointed, flowers pale pink. Common in shady places. Mahoba, *Bhatt.* 17895, Sept. 1961.

Elytraria acaulis (Linn. f.) Lindau.

Acaulescent herb with slender green rigid, spikes, flowers minute white. Fairly common. Mahoba, *Bhatt.* 17887, Sept. 1961 ; *Malhotra* 21446, July 1962.

Eranthemum purpurascens Nees

Undershrub on shady stream bank, flowers bluish white. Occasional. Bela Tal, *Bhatt.* 21023, Apr. 1962.

Hemigraphis latebrosa Nees

Decumbent herb, flowers small blue. Rare on the margins of the flowing streams. Bela Tal, *Bhatt.* 21034, Apr. 1962.

Hygrophila auriculata (Schum.) Heine

Marshy herb with axillary spinous spikes and purple flowers. Abundant near water deposits. Mahoba, *Bhatt.* 17859, Sept. 1961.

H. polysperma T. Anders.

Small herb near water, flowers pale pink. Common. Mahoba, *Bhatt.* 20472, Mar. 1962.

Justicia diffusa Willd.

Branching small herb, flowers pale pink in slender spike. Common. Mahoba, *Bhatt.* 17795, Sept. 1961 ; *Malhotra* 21462A, July 1962.

J. peploides T. Anders.

Branching pubescent herb with hairy elongated spikes and small white flowers. Common in cultivated fields. Hamirpur, Mahoba, *Bhatt.* 17832, Sept. 1961 ; *Malhotra* 21462B, July 1962.

Lepidagathis hamiltoniana Wall.

Herb with square, jointed stem and globose spinous spike, flowers pale pink. Common in rock crevices. Mahoba, *Bhatt.* 17932, Sept. 1962.

Nelsonia campestris R. Br.

Decumbent herb on shady stream bank, flowers small pale pink in hairy spikes. Rare. Bela Tal, *Bhatt.* 21029, Mar. 1962.

Peristrophe bicalyculata Nees

Branching herb with small, pink bilipped flowers. Common on ruined buildings. Hamirpur, *Bhatt.* 17838, Sept. 1961.

VERBENACEAE

Clerodendrum phlomidis Linn. f.

Tomentose branching shrub, flowers fragrant white. Mahoba, *Bhatt.* 17872, 20461, Sept. 1961, Mar. 1962 ; *Malhotra* 22836, July 1962.

Lantana camara Linn. var. **aculeata** (Linn.) Moldenke

Aromatic shrub, flowers yellow and red. Common. Bela Tal, *Bhatt.* 21048, April 1962. Mahoba, *Malhotra* 21496, July 1962.

Phyla nodiflora (Linn.) Greene

Repent herb near water, flowers small white. Common. Mahoba, *Malhotra* 21445, July 1962.

LABIATAE

Anisochilus carnosus Wall.

Erect pubescent herb with terminal naked oblong, spikes, flowers small pale blue. Common. Mahoba, *Bhatt.* 17785, Sept. 1961.

Anisomeles indica (Linn.) O. Kuntze

Aromatic herb, flowers purple and white. Common on the river bank. Hamirpur, *Bhatt.* 17819, 17820, Sept. 1961.

Hyptis suaveolens (Linn.) Poit.

Aromatic annual herb, flowers small blue. Abundant. Bela Tal, *Bhatt.* 21039, Apr. 1962.

Leonotis nepetaefolia Br.

Erect robust herb with globose, spiny, axillary spikes, flowers orange red. Rare within bushes. Mahoba, *Bhatt.* 17844, Sept. 1961.

Leucas aspera Spreng.

Herb, flowers white. Common in fallow lands. Hamirpur, *Bhatt.* 20951, Mar. 1962.

L. cephalotes Spreng.

Smooth tomentose herb, flowers white in terminal spikes. Common in cultivated fields. Mahoba, *Bhatt.* 17876, Sept. 1961.

L. procumbens Desf.

Decumbent perennial herb, flowers white. Fairly common. Bela Tal, *Bhatt.* 21031, Apr. 1962.

L. urticaefolia Br.

Herb with axillary globose cymes, flowers small white. Common. Hamirpur, *Bhatt.* 17800, Sept. 1961.

Nepeta hindostana (Roth) Haines

Herb, flowers small bluish white. Common. Hamirpur, *Bhatt.* 20933, Mar. 1962.

Ocimum basilicum Linn.

Branching aromatic herb, flowers small white. Common in cultivated fields. Hamirpur, *Bhatt.* 17831, Sept. 1961.

Orthosiphon pallidus Royle

Perennial herb with long root stock, flowers small white, occasional. Hamirpur, *Bhatt.* 20937, Mar. 1962.

Pogostemon plectranthoides Desf.

Aromatic undershrub with massive spikes, flowers small light pink. Mahoba, *Bhatt.* 21013, Mar. 1962.

Salvia plebeia Br.

Erect branching herb, flowers small white in fairly long spikes. Common. Mahoba, *Bhatt.* 20453, Mar. 1962.

NYCTAGINACEAE

Boerhaavia diffusa Linn.

Perennial herb trailing on the ground, flowers

pink. Fairly common. Mahoba, *Malhotra* 21437, July 1962.

Boerhaavia repanda Willd.

A straggling herb on the hedges and in bushes, flowers pale pink. Fairly common. Mahoba, Hamirpur, Bela Tal, *Bhatt.* 17805, 21010, 21025, Sept. 1961, Mar. & Apr. 1962.

AMARANTHACEAE

Achyranthes aspera Linn.

Herb with slender spikes. Common in waste places. Mahoba, *Bhatt.* 20919, Mar. 1962, *Malhotra* 22825, July 1962.

Aerva lanata Juss.

Tomentose herb, flowers in small oblong white spikes. Common. Mahoba, *Bhatt.* 17901, 20419, Sept. 1961, Mar. 1962; *Malhotra* 22844, July 1962.

Alternanthera polygonoides (Linn.) R. Br.

Procumbent herb, flowers scarious white. Common. Hamirpur, *Bhatt.* 20938, Mar. 1962.

A. sessilis (Linn.) DC.

Marshy herb, spikes axillary purplish white, scarious. Common. Mahoba, *Bhatt.* 17783, Sept. 1961; *Malhotra* 22815, July 1962.

Amaranthus polygamus Linn.

Herb, spikes small axillary, green. Common in shady places. Hamirpur, *Bhatt.* 20942, Mar. 1962; Mahoba, *Malhotra* 21436, July 1962.

A. spinosus Linn.

Spinous herb in waste places, spikes green, spiny. Mahoba, *Bhatt.* 20449, Mar. 1962.

A. viridis Linn.

Herb with green spikes. Common in shady places. Mahoba, *Bhatt.* 20920, Mar. 1962; *Malhotra* 21436, 22834, July 1962.

Celosia argentea Linn.

Herb with purplish white, terminal conical spikes. Common in cultivated fields. Mahoba, *Bhatt.* 17789, Sept. 1961.

Digera muricata (Linn.) Mart.

Small branching herb, spikes purplish green. Common in cultivated fields. Hamirpur, *Bhatt.* 17834, Sept. 1961.

Gomphrena celosioides Mart.

Herb with globose, white, scarious spikes. Common. Mahoba, *Bhatt.* 20929, Mar. 1962; *Malhotra* 21433, July 1962.

Pupalia lappacea (Linn.) Juss.

Straggling herb, spikes long greenish white, naked fruit zoochorous. Common on hill slopes. Mahoba, *Bhatt.* 17788, 20923, Sept. 1961. Mar. 1962.

CHENOPODIACEAE

Chenopodium album Linn.

Growing as a weed in crop fields, flowers small greenish. Mahoba, *Bhatt.* 20454, 20456, Mar. 1962.

POLYGONACEAE

Polygonum glabrum Willd.

Herb near water, flowers small pale pink. Fairly common. Mahoba, *Malhotra* 21447, July 1962.

P. plebejum R. Br.

Diffuse, prostrate herb, flowers small, pink, abundant in moist areas. Mahoba, *Bhatt.* 20420, Mar. 1962.

P. plebejum R. Br. var. **griffithii** Hk. f.

Flat herb forming rosettes, flowers minute pink. Mahoba, *Malhotra* 21445, July 1962.

Rumex dentatus Linn.

Herb, flowers green, fruits winged. Common in moist places. Mahoba, *Bhatt.* 20491, Mar. 1962.

LAURACEAE

Cassytha filiformis Linn.

Green extensive, cord like parasite with small white flowers. Common on *Carissa* on the dry hill slopes. Mahoba, *Bhatt.* 17782, Sept. 1962.

EUPHORBIACEAE

Acalypha ciliata Forsk.

Small erect herb in boulder crevices, flowers minute green. Occasional. Mahoba, *Bhatt.* 17931, Sept. 1961.

Baliospermum montanum Muell.-Arg.

Dwarf shrub, flowers yellowish green, unisexual. Abundant. Mahoba, *Bhatt.* 17962, 20925, 21002, Sept. 1961, Mar. 1962.

Chrozophora obliqua A. Juss.

Herb, flowers minute, reddish in colour. Occasional. Hamirpur, *Bhatt.* 20943, Mar. 1962.

C. prostrata Dalz.

A prostrate densely stellate hairy herb; capsules stellate hairy. Mahoba, *Malhotra* 21479, July 1962.

C. rottleri (Gies.) Juss. ex Spr.

An annual herb. Capsules densely stellate hairy. Mahoba, *Malhotra* 22843, July 1962.

Croton bonplandianum Baill.

Branching foetid herb, flowers unisexual greenish white. Common on the river bank. Hamirpur, *Bhatt.* 17828, Sept. 1961.

Euphorbia dracunculoides Lamk.

Glaucous green herb with yellow cyathia. Common. Mahoba, *Bhatt.* 20499, Mar. 1962; Hamirpur, 20975, Mar. 1962.

E. geniculata Ort.

Erect herb with green cyathium. Rare on shady pool bank. Mahoba, *Bhatt.* 17924, Sept. 1961.

E. hirta Linn.

Common weed of waste places, flowers purplish green minute. Hamirpur, *Bhatt.* 20961, Mar. 1962; Mahoba, *Malhotra* 22822, July 1962.

E. hypericifolia Linn.

Erect herb, leaves glaucous, with axillary green cyathia. Common. Mahoba, Charkhari, *Bhatt.* 17851, Sept. 1961; *Malhotra* 21486, 22821, July 1962.

E. prostrata Ait.

Prostrate herb, leaves small two ranked, flowers, very minute. Charkhari, *Malhotra* 21488, July 1962.

E. microphylla Lamk.

Small procumbent herb, cyathia axillary. Com-

mon. Mahoba, *Bhatt.* 20430, Mar. 1962 ; Charkhari, *Malhotra* 21493, July 1962.

Kirganelia reticulata (Poir.) Bail.

Branching shrub with purplish green flowers and black drupes. Mahoba, *Bhatt.* 17869, Sept. 1961.

Phyllanthus fraternus Webst.

Tender erect herb in waste places, flowers minute, green, fairly common. Mahoba, *Malhotra* 22820, July 1962.

P. maderaspatensis Linn.

Herb with superposed obovate leaves, flowers green. Common. Mahoba, *Bhatt.* 20916, Mar. 1962 ; Charkhari, *Malhotra* 21490, July 1962.

P. simplex Retz.

Decumbent herb with woody root stock. Flowers minute green. Fairly common. Mahoba, *Bhatt.* 17944, 20909, Sept. 1961.

Securingea virosa (Roxb. ex Willd.) Pax et Hoff.

Shrub with small green flower buds, globose fruits. Occasional on the hill slopes. Mahoba, *Malhotra* 22801, July 1961.

URTICACEAE

Ficus benghalensis Linn.

Common avenue tree with axillary paired hypanthodia. Mahoba, *Bhatt.* 20995, Mar. 1962.

F. glomerata Roxb.

Large tree, with red hypanthodia. Fairly common. Mahoba, *Bhatt.* 20997, Mar. 1962.

F. religiosa Linn.

Common road side tree with young fruits. Mahoba, *Bhatt.* 20996, Mar. 1962.

F. tomentosa Roxb. ex Willd.

Tree, leaves tomentose, fruits sessile in axillary pair, fairly common. Mahoba, *Malhotra* 21495, July 1962.

ULMACEAE

Holoptelea integrifolia (Roxb.) Planch.

Tree, fruits orbicular, winged. Common on the hill slopes. Mahoba, *Bhatt.* 20403, Mar. 1962.

CERATOPHYLLACEAE

Ceratophyllum demersum Linn.

Submerged aquatic herb, flowers axillary, unisexual, fruits with 3-spines. Abundant in the lakes. Mahoba, *Bhatt.* 17952, 20903, Sept. 1961 ; Mar. 1962 ; *Malhotra* 21440, July 1962.

HYDROCHARITACEAE

Hydrilla verticillata (Linn. f.) Royle

Submerged aquatic herb, male flowers minute white on slender stalks. Common. Mahoba, *Bhatt.* 17951, 20927, Sept. 1961, Mar. 1962.

Nechamandra alternifolia (Roxb.) Thw.

Submerged, tender dioecious herb, flowers white. Abundant in the lakes. Mahoba, *Bhatt.* 17953, Sept. 1961.

Ottelia alismoides (Linn.) Pers.

Submerged, large aquatic herb, flowers white. Fairly common in pools. Mahoba, *Bhatt.* 17865, Sept. 1961.

Vallisneria spiralis Linn.

Submerged dioecious aquatic, female flowers floating on long stalks, male on short stalk, gray. Abundant in Betwa margin. Mahoba, *Bhatt.* 20972, 20973, Mar. 1962.

LILIACEAE

Asphodelus tenuifolius Cav.

Herb, flowers white. Common weed in cultivated fields. Mahoba, *Bhatt.* 20462, Mar. 1962.

Gloriosa superba Linn.

Tall resting herb with leaf tendrils, flowers large showy orange yellow to red. Common. Mahoba, *Bhatt.* 17961, Sept. 1961.

Scilla hyachinthina Moehr.

Bulbous herb, leaves blotched with black, flowers white with violet tinge. Common on the hills. Mahoba, *Malhotra* 21474, July 1962.

PONTEDERIACEAE

Monochoria vaginalis (Burm. f.) Presl ex Kunth

Aquatic herb, rooting in the mud, flowers pale blue, borne on petiolar scapigerous racemes. Common. Hamirpur, *Bhatt.* 17781, Sept. 1961.

COMMELINACEAE

Cyanotis axillaris Schult. f.

Herb in water margin, leaves distichous, linear, flowers bluish. Common. Mahoba, *Bhatt.* 17773, Sept. 1961.

C. cristata (Linn.) Don.

Succulent herb, flowers blue. Common. Mahoba, *Bhatt.* 17896, Sept. 1961.

C. fasciculata Schult. f.

Brownish or purplish green fleshy herb on dry rocks, flowers purple. Fairly common. Mahoba, *Bhatt.* 17775, Sept. 1961.

Commelina hasskarlii Cl.

Herb in shady moist places with fruits. Common. Mahoba, *Bhatt.* 20471, Mar. 1962.

C. paludosa Bl.

Tall resting herb with swollen nodes and cupular scapes, flowers pale blue, conspicuous. Common within bushes. Mahoba, *Bhatt.* 17855, 21000, Sept. 1961, Mar. 1962.

Murdannia nudiflora (Linn.) Brenan

Small herb, flowers pale blue. Common. Mahoba, *Bhatt.* 17912, Sept. 1961.

JUNCACEAE

Juncus bufonius Linn.

Caespitose herb on moist ground, flowers at the forks of the branches. Common. Mahoba, *Bhatt.* 20475, Mar. 1962.

TYPHACEAE

Typha angustata Chaub. et Bory

Rhizomatous robust marshy herb, spikes compact interrupted, dark brown. Common in pools. Mahoba, *Malhotra* 21465, July 1962.

ARACEAE

Pistia stratiotes Linn.

Floating aquatic herb with stoloniferous stem and

greenish white flowers. Common in lakes. Mahoba, *Bhatt.* 17955, Sept. 1961 ; Charkhari, *Malhotra* 21491, July 1962.

LEMNACEAE

Spirodela polyrrhiza (Linn.) Schleid.

Floating aquatic herb. Common in the lakes. Mahoba, *Bhatt.* 20904, Mar. 1962.

Lemna trisulca Linn.

Free floating aquatic herbs with slender branches and oblong leafy segments. Mahoba, *Bhatt.* 21014, Mar. 1962.

L. paucicostata Hegelm.

Bright green floating aquatic in stagnant pools. Common. Mahoba, *Bhatt.* 17601A, Sept. 1961.

ALISMATACEAE

Limnophyton obtusifolium (Linn.) Miq.

Spongy marshy herb with large sagittate leaves. Flowers white in repeated cymes. Rare in marshy places. Bela Tal, Mahoba, *Bhatt.* 17948, 21052, Sept. 1961 ; Apr. 1962.

Sagittaria guayanensis H.B.K. ssp. *lappula* (D. Don) Bogin.

Fixed aquatic herb with floating leaves, flowers white. Fairly common. Mahoba, *Bhatt.* 18405, Sept. 1961.

POTAMOGETONACEAE

Potamogeton crispus Linn.

Submerged aquatic herb, leaves with crisped margins. Spikes brown. Abundant in the lakes. Mahoba, *Bhatt.* 20924, Mar. 1962.

P. nodosus Poir.

Aquatic herb, leaves dimorphic, spikes rigid brown. Common on the margins of lakes. Mahoba, *Bhatt.* 20998, Mar. 1962 ; *Malhotra* 21468, July 1962.

P. pectinatus Linn.

Submerged aquatic herb in moving streams, leaves acicular, greenish brown, spikes brown. Abundant in the Betwa margin. Hamirpur, *Bhatt.* 20966, Mar. 1962.

P. perfoliatus Linn.

Submerged aquatic herb, rooting in the mud, spikes brown, common on the Betwa river margin. Hamirpur, *Bhatt.* 20963, Mar. 1962.

NAJADACEAE

Najas graminea Del.

Submerged aquatic herb, flowers axillary, minute, white. Abundant in the pools. Mahoba, *Bhatt.* 17950, Sept. 1961.

N. minor (Pers.) All.

Submerged aquatic herb, common in the pools. Mahoba, *Bhatt.* 20926, Mar. 1962.

CYPERACEAE

Cyperus compressus Linn.

Small sedge with one or two scapes. Spikes greenish brown, flat. Common in cultivated fields. Mahoba, *Bhatt.* 17850, Sept. 1961 ; *Malhotra* 21430, July 1962.

C. corymbosus Rottb.

Tall sedge in marshy places. Spikes terminal brown. Common. Mahoba, *Bhatt.* 17913, Sept. 1961 ; *Malhotra* 20481, July 1962.

C. cyperioides (Linn.) O. Kuntze

Tall or medium-sized sedge with green terminal panicle. Fairly common. Mahoba, *Bhatt,* 17936, Sept. 1961.

C. difformis Linn.

Annual glabrous sedge with green globose spikes. Mahoba, *Bhatt.* 20982, Mar. 1962 ; *Malhotra* 21472, July 1962.

Cyperus iria Linn.

Common marshy or aquatic sedge with greenish brown flat spikes. Mahoba, *Bhatt.* 17934, Sept. 1961.

C. kyllingia Endl.

Caespitose rhizomatous sedge, spikes green ovoid. Very common. Mahoba, *Bhatt.* 20984, Mar. 1962.

C. nutans Vahl

Caespitose sedge with green terminal umbellate panicle. Common. Mahoba, *Bhatt.* 20992, Mar. 1962.

C. niveus Retz.

A perennial sedge with white flat spikes. Mahoba, *Malhotra* 22810, July 1962.

C. pumilus Linn.

Caespitose minute sedge with greenish white flat spikes. Common in marshy places. Mahoba, *Bhatt,* 17847, Sept. 1961.

C. pygmaeus Rottb.

An annual sedge. Inflorescence a dense solitary terminal head. Common. Mahoba, *Malhotra* 21431, July 1962.

C. rotundus Linn.

Small semi-aquatic sedge. Spikes greenish brown in panicles. Mahoba, *Malhotra* 21492, July 1962.

Eleocharis atropurpurea (Retz.) Kunth

Caespitose sedge spikes brown terminal. Mahoba, *Bhatt.* 20483, Mar. 1962 ; *Malhotra* 21456, July 1962.

E. palustris (Linn.) R. Br.

Tubular aquatic sedge with terminal brown spikes. Fairly common. Hamirpur, *Bhatt.* 20965, Mar. 1962 ; Mahoba, *Malhotra* 21469, July 1962.

Fimbristylis dichotoma (Linn.) Vahl

Small sedge with terminal spreading panicles. Common in wet places. Mahoba, *Malhotra* 22831, July 1962.

F. diphylla Vahl

Tall sedge with brown panicles. Common. Mahoba, *Bhatt.* 17861, Sept. 1961.

F. junciformis Kunth

Medium-sized sedge. Spikes dark brown. Occasional in wet places. Mahoba, *Malhotra* 22805, July 1962.

F. monostachya Hassk.

Rigid deep greenish sedge on dry hill slopes with glabrous brownish green spikes. Mahoba, *Bhatt.* 17915, Sept. 1961 ; *Malhotra* 21805, July 1962.

Fimbristylis schoenoides Vahl

Caespitose slender herb with pale brown, solitary or paired oblong ovate spikes. Common on the moist cultivated fields. Mahoba, *Bhatt.* 17858, Sept. 1961.

Juncellus alopecuroides C.B. Cl.

Tall sedge growing in shallow water. Scape triangular, spikes green. Common in ponds and marshy places. Mahoba, *Bhatt.* 20452, Mar. 1962 ; *Malhotra* 21435, July 1962.

Scirpus articulatus Linn.

Marshy caespitose sedge. Spikes capitate. Common. Mahoba, *Bhatt.* 20485, Mar. 1962 ; *Malhotra* 21458, July 1962.

S. martimus Linn. var. **affinis** (Roth) Cl.

Sedge near water with brown spikes. Common. Mahoba, Hamirpur, *Bhatt.* 20413, 20969, Mar. 1962.

S. squarrosus Linn.

Slender sedge with echinate spikes. Common in cultivated fields. Mahoba, *Bhatt.* 17849, Sept. 1961.

S. supinus Linn.

Caespitose sedge spikes greenish brown. Abundant in marshy places. Mahoba, *Bhatt.* 20981, Mar. 1962. *Malhotra* 21457, July 1962.

GRAMINEAE

Apluda mutica Linn.

Tall resting grass with slender stem and much branched panicle. Common within bushes. Hamirpur, Mahoba, *Bhatt.* 17808, 17903, Sept. 1961 ; *Malhotra* 22811, July 1962.

Aristida adscensionis Linn.

Small grass with needle like spikes. Fairly common on the river bank. Hamirpur, *Bhatt.* 17823, Sept. 1961.

A. funiculata Trin. et Rupr.

Small slender grass with three acicular long awned spikes. Common on the river bank. Hamirpur *Bhatt.* 17824, Sept. 1961.

Avena fatua Linn.

Tall cultivated grass. Panicle green. Mahoba, *Bhatt.* 20915, Mar. 1962.

Bothriochloa kuntzeana (Hack.) Henr.

Tall grass with terminal, purplish green spreading panicle. Very common. Mahoba, *Bhatt.* 17926, Sept. 1961.

Cenchrus biflorus Roxb.

Small grass with rigid bristly panicle. Common on the river bank. Hamirpur, *Bhatt.* 17815, Sept. 1961.

Chloris barbata Sw.

Medium sized erect grass with white panicle. Common on the river bank. Hamirpur, *Bhatt.* 17821, Sept. 1961.

C. virgata Sw.

Erect grass with leaves shorter than the stem. Spikes greenish white. Mahoba, *Malhotra,* July 1962.

C. dolichostachya Lagasca

Tall grass with terminal very long slender digitate greenish white spikes. Mahoba, *Bhatt.* 17963, Sept. 1961.

Crypsis schoenoides (Linn.) Lamk.

Flat rigid small grass in shallow depressions. Spikes short greenish white. Bela Tal, *Bhatt.* 21038, Apr. 1962.

Cynodon dactylon (Linn.) Pers.

Common perennial grass with terminal digitate spikes. Mahoba, *Malhotra* 22829, July 1962.

Dactyloctenium aegyptium (Linn.) P. Beauv.

Small grass with digitate terminal spikes. Common in cultivated fields. Hamirpur, *Bhatt.* 17840, Sept. 1961 ; 20947, Mar. 1962.

Digitaria sanguinalis (Linn.) Scop.

Common grass in cultivated fields with terminal 3-4 slender digitate spikes. Hamirpur, *Bhatt.* 17801, Sept. 1961.

Echinochloa colonum (Linn.) Link

Common grass in waste places. Spikes dark brown. Mahoba, *Malhotra* 22819, July 1962.

E. crusgalli (Linn.) P. Beauv.

Submerged aquatic grass rooting in the mud, with large compact awned panicle. Common in lakes. Mahoba, *Bhatt.* 17920, Sept. 1961.

Eleusine indica (Linn.) Gaertn.

Grass with leaves longer than stem. Spikes green. Mahoba, *Malhotra* 22835, July 1962.

Eragrostiella brachyphylla (Stapf) Bor

Grass with elongated sessile, brownish white spike. Common on the dry hill slopes around the lakes. Mahoba, *Bhatt.* 17914, Sept. 1961.

Eragrostis ciliaris (Linn.) R. Br.

Small grass, spikes greenish white. Rare on the river bank. Hamirpur, *Bhatt.* 17839, Sept. 1961.

E. gangetica (Roxb.) Steud.

Caespitose grass with grey green panicle. Common. Mahoba, *Bhatt.* 20993, Mar. 1962.

E. japonica (Thunb.) Trin.

Caespitose grass on canal bank with loose purplish green panicle. Common. Mahoba, *Bhatt.* 20902, 20989, Mar. 1962.

E. nutans (Retz.) Nees ex Steud.

Branching grass with spreading greenish white panicle. Common. Mahoba, *Bhatt.* 17917, 17943, 20979, Sept. 1961 ; Mar. 1962.

E. tenella (Linn.) P. Beauv. ex Roem. et Schult.

Small grass. Panicle greenish white. Common in cultivated fields. Hamirpur, *Bhatt.* 17822, Sept. 1961.

Hygroryza aristata (Retz.) Nees ex Wt. & Arn.

Floating aquatic grass with spongy sheath. Common in lakes. Mahoba, *Bhatt.* 17919, Sept. 1961 ; 21011, Mar. 1962.

Ischaemum rugosum Salisb.

Tall aquatic or marshy grass, spikes terminal pale green. Common. Mahoba, *Bhatt.* 17863, Sept. 1961.

Melanocenchris jacquemontii Faub. et Spach

Annual grass with filiform spikes. Common. Mahoba, *Bhatt.* 17768, Sept. 1961.

Oryza rufipogon Griff.

Wild rice in shallow water margin. Common. Mahoba, *Bhatt.* 17966, Sept. 1961.

Panicum paludosum Roxb.

Large floatng aquatic grass with fistular stem and large terminal loose panicle. Mahoba, Bela Tal, *Bhatt.* 17918, 21037, Sept. 1961 ; Apr. 1962.

Paspalidium punctatum (Burm.) A. Camus.

Aquatic grass. Spikes green. Fairly common. *Bhatt.* 20922.

Perotis indica (Linn.) O. Kuntze

Small pretty grass with lanceolate leaves and very slender purple awned elongated spikes. Fairly common on the river bank. Hamirpur, *Bhatt.* 17830, Sept. 1961.

Phalaris minor Retz.

Grass growing as a weed in the cultivated fields. Spikes pale green. Very common. Mahoba, *Bhatt.* 20494, Mar. 1962.

Polypogon monspeliensis (Linn.) Desf.

Common grass in cultivated fields. Spikes green. Mahoba, *Bhatt.* 20943, Mar. 1962.

Pseudoraphis spinescens (R. Br.) Vickery

Very tall slender aquatic grass. Flowering panicle greenish white projecting above the water. Abundant along the margin of the lakes. Mahoba, *Bhatt.* 17921, Sept. 1961.

Setaria pallide-fusca (Schumach.) Stapf et Hubb.

Pretty erect grass with smooth purplish green spikes. Common in cultivated fields. Mahoba, *Bhatt.* 17938, Sept. 1961 ; *Malhotra* 22827, July 1962.

Sporobolus diander (Retz.) P. Beauv.

Tender grass with very loose panicle. Spikes greenish white. Common. Mahoba, *Bhatt.* 20990, Mar. 1962.

Triticum aestivum Linn.

Cultivated common wheat. Mahoba, *Bhatt.* 20451, Mar. 1962.

Vetiveria zizanioides (Linn.) Nash

Tall aquatic grass with terminal spreading greenish brown panicle. Rare in lakes. Mahoba, *Bhatt.* 17899, Sept. 1961.

POLYPODIACEAE

Actiniopteris australis Link

Fairly common on dry hill in rock crevices with dark brown sori. Mahoba, *Bhatt.* 17792, Sept. 1961 ; *Malhotra* 21452, July 1962.

MARSILEACEAE

Marsilea minuta Linn.

Fixed floating aquatic, rooting at the nodes, sporocarps mostly in pairs sometimes three. Common. Mahoba, Charkhari, *Malhotra* 21460, 21484, July 1962.

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